COMPLETE LISTING OF CLAIMS, INCORPORATING AMENDMENTS
IN RESPONSE TO OFFICE ACTION DATED SEPTEMBER 6, 2005
FOR SERIAL NO. 10/731,772

The embodiment of the invention in which an exclusive property or privilege is claimed is defined as follows:

1. (Currently Amended) A method for depth-resolved detection of subsurface micro-structure and features in a sample, said method comprising:

a) producing a first illumination of the sample with light possessing polarization in a first direction of polarization creating a first diffraction limited focal point within the sample;

b) measuring light intensity emanating from the first diffraction limited focal point ~~sample~~ resulting from said first illumination that is polarized in a second direction of polarization;

c) ~~allowing~~ changing the relative position and orientation of the ~~light beam~~ first diffraction limited focal point and the sample ~~to change~~ in one or more directions;

d) producing a second illumination of the sample with light possessing polarization in the first direction of polarization creating a second diffraction limited focal point directed within the sample;

e) measuring light intensity emanating from the second diffraction limited focal point ~~sample~~ resulting from said second illumination that is polarized in the second direction of polarization; and

f) multiplying the measured light intensity emanating from said first diffraction limited focal point by a factor compensating for attenuation of light within said sample material;

g) multiplying the measured light intensity emanating from said second diffraction limited focal point by a factor compensating for attenuation of light within said sample;

~~f~~h) comparing emanating light intensity between said first diffraction limited focal point and said second diffraction limited focal point ~~illuminations~~.

2. (Currently Amended) The method as recited in claim 1 wherein said first illumination and said second illumination ~~illuminating light is~~ are provided by a laser.

3. (Currently Amended) The method as recited in claim 1 wherein said first illumination and said second illumination ~~illuminating light is~~ are constricted to emanate from a polarization-maintaining optical fiber creating a point source, and wherein the diameter of the optical fiber is between 1-10 microns.

4. (Original) The method as recited in claim 1 wherein steps c) through f) are repeated to obtain multiple positions and orientations of the sample and wherein the emanating light intensity with said second direction of polarization is measured as a function of said positions and orientations.

5. (Currently Amended) The method as recited in claim 3 [[1]] wherein said constricted illuminating light is ~~expanded by a lens and wherein said illuminating light and said emanating light traverse a polarized beam splitter~~:

a) expanded by an expanding lens;

b) traversed through a polarized beam splitter; and

c) focused by a focusing lens creating said first diffraction limited focal point and said second diffraction limited focal point within the sample.

6. (Currently Amended) The method as recited in claim 1 wherein said measuring utilizes ~~means comprises~~ an optical detector assembly.

7. (Original) The method as recited in claim 1 wherein the deflected beam is redirected to successive spots on the sample by means of a laser scan system.

8. (Cancelled)

9. (Original) The method as recited in claim 1 wherein said sub-surface micro-structure is detected through enhancement of the light intensity emanating from the material with said second direction of polarization.

10. (Currently Amended) A device for depth-resolved detection of subsurface micro-structure and features in a sample, said device comprising:

a) an initial beam of light polarized in a first direction;

b) a stage that is movable and orientable in one or more directions; wherein said stage is in optical communication with said initial beam;

c) means to deflect said initial beam creating a diffraction limited focal point within ~~towards a spot on a~~ said sample mounted on the stage so as to produce an illumination of the sample at ~~a first location and orientation of the sample~~ various three-dimensional locations within said sample;

d) means to select light emanating from said illumination when said emanating light has a second direction of polarization and is from said diffraction limited focal point;

e) means to measure the selected ~~emanating~~ light intensity emanating directly from the diffraction limited focal point ~~the illuminated spot.~~;

f) means to compensate the measured emanating light intensity for attenuation of light within said sample.

11. (Currently Amended) The device as recited in claim 10 wherein said initial beam is provided by a laser and is constricted to emanate from a polarization-maintaining optical fiber creating a point source, wherein the diameter of the optical fiber is between 1-10 microns.

12. (Currently Amended) The device as recited in claim 10 wherein said initial beam is expanded by a first lens; said deflected beam is focused by a second lens creating said diffraction limited focal point below the surface of ~~on~~ the sample ~~by a second lens~~; and said light emanating from the ~~sample~~ diffraction limited focal point is focused on said measuring means by a third lens.

13. (Original) The device as recited in claim 10 wherein said deflection means and said selection means are combined in a polarized beam splitter.

14 (Original) The device as recited in claim 10 wherein said measuring means comprises a pinhole and an optical detector assembly.

15. (Original) The device as recited in claim 10 wherein said initial beam, deflecting means, selecting means, moving means, orienting means, and measuring means are held in a fixed relation with respect to each other.

16. (Currently Amended) The device as recited in claim 10 further comprising:

a) means to redirect the ~~deflected~~ diffraction limited focal point beam to successive spots ~~on~~ within the sample by a laser scan system; and

b) means to compare the emanating light intensity from said successive spots.

17. (Currently Amended) The device as recited in claim 10 further comprising means to compare the measured emanating light intensity from successive illuminations when the location and orientation of the illumination on the sample is changed ~~from the first location and orientation~~.

18. (Currently Amended) A device for depth-resolved detection of sub-surface micro-structure and features in a sample, said device comprising:

a) a laser producing a beam of light polarized in a first polarization direction;

b) an optical fiber transmitting said beam while maintaining said first polarization direction such that said beam exits from said fiber as from a point like source, wherein the diameter of the optical fiber is between 1-10 microns ;

c) a first lens expanding said beam;

d) a polarized beam splitter deflecting said beam toward a sample;

e) a second lens focusing said deflected beam ~~onto whereas the focal point is the sample~~ creating a diffraction limited focal point below the surface of said sample;

f) a stage supporting said sample, said stage movable and orientable in one or more directions so as to vary positions and orientations of the sample relative to the deflected beam, said sample so mounted on said stage in a first stage position and orientation that light scattered from said sample is directed toward said second lens;

g) said second lens collecting said scattered light and directing said scattered light toward the polarized beam splitter;

h) said polarized beam splitter adapted so as to transmit only a portion of the scattered light that is polarized in a second direction of polarization distinct from said first direction of polarization;

i) a third lens focusing said transmitted light through a diffraction limited pinhole onto a detector assembly adapted to measure the ~~transmitted~~ light transmitted from the diffraction limited focal point as a function of said stage motion and orientation;

j) means to compensate the measured light transmitted from the diffraction limited focal point for attenuation of light within said sample;

wherein said laser, optical fiber, first lens, polarized beam splitter, second lens, diffraction limited focal point, stage, third lens, pinhole, and detector assembly are held in a fixed relation with respect to each other.

19. (Original) The device as recited in claim 18 wherein the deflected beam is redirected to successive spots on the sample by a laser scan system.

20. (Original) The device as recited in claim 18 further comprising means to digitize, store, and visualize the measurements made by said detector assembly.

21. (New) The method as recited in claim 1 wherein steps c) through f) are repeated to obtain multiple measurements and the stage is moved in three-dimensions in a raster fashion; and a means to create a three-dimensional image from the multiple measurements.